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A STUDY TO KNOW THE LEVEL OF AWARENESS OF HEALTHCARE WORKERS DURING THE CORONA PANDEMIC

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ABSTRACT

The aim of this research is to identify the level of knowledge and practices of health care workers towards the occupational risks surrounding them in some hospitals in the Kingdom of Saudi Arabia. It is a study to measure awareness using KAP, and it aims to know the impact of training on the level of awareness. The descriptive analytical survey approach and the semi-experimental approach were used through the pre and post examination for its suitability for this research, and the study was conducted on a sample consisting of 326 categories of doctors, nursing, laboratory specialists and the experimental group to conduct the training, the results of the study showed that the level of knowledge was good before the training program and the axes of directions The practices and training were not satisfactory in the total group before the program. After the training program, the levels of all axes rose with arithmetic averages, some of which reached 100%, which confirms the need to intensify training programs for workers and this is what the researchers recommended in addition to the need for an entity responsible for monitoring and developing procedures. Protection from occupational exposures in light of the Corona pandemic and raising awareness among workers.

INTRODUCTION

Occupational health is the science concerned with studying the health status of workers in different professions, in addition to studying the environmental factors and risks that arise in the work environment, and it is also a set of procedures and rules established in a legislative framework with the aim of protecting workers from injuries, serious accidents and occupational diseases.

The World Health Organization and the International Labor Office set occupational health goals in 1950 as they aim to work to achieve and maintain the highest levels of physical, psychological and social fitness for workers in all sectors of work, to ensure that workers are not deprived of health reasons because of their working conditions, and to protect workers in their work from the resulting dangers. On the presence of factors harmful to their health, and to assign the worker to work that matches his physical and psychological readiness to achieve harmony between the worker and his currency[1]. Promoting safe and healthy working conditions has been a consistent goal at work. The International Labor Organization since its founding in 1919, where the percentage of all workers in the world who have access to occupational health services is estimated between 10 to 20, including health care workers[2].

The worldwide healthcare workforce represents 12% of all workers [3]. In a report issued by the World Health Organization, the number of workers in health care facilities reached about 8.59 million health care employees worldwide, one third of them provide health services while the rest are administrative and support services staff [4]. Approximately 100,000 people die from occupational diseases, while about 400,000 new cases are diagnosed with occupational diseases each year [5]. The World Health Organization estimated in 2003 that there were approximately 1,600 cases of hepatitis C virus and 66,000 cases of infection with the hepatitis C virus. Hepatitis B, 1,000 HIV infections occur every year worldwide for health care workers.[6]

Healthcare workers are the backbone of the global health, and they work in a variety of settings, such as hospitals, nursing homes, clinics, homes for homeless patients, in refugee camps, care centers, nurseries, schools and industry. Globally, healthcare workers are exposed every day to a variety of occupational health and safety risks. The work environment in healthcare is complex and multi-risk [7] Healthcare workers are more likely to have work-related injuries than workers in most other occupations and emergency healthcare providers face job-related hazards on a daily basis as they regularly encounter safety risks that put them at risk of injury [8]. Injuries and occupational diseases among health care providers are well documented in developed western countries [9].

It is known that the hospital environment is one of the most dangerous environments and places for work and workers [10, 11]. Health care workers are exposed to many biological, chemical, physical and psychological hazards resulting

from their daily activities that may threaten their lives in some cases. Nearly 3 million percutaneous exposure occurs annually among health care workers worldwide, more than 90% of them in countries with limited resources (Moore 1990) and health care workers (HCWs) are as vulnerable to occupational health risks in the workplace as others. Of workers in large industrial facilities, including exposure to heavy metals, organic solvents, as well as the risk of biological infection that arises while dealing with patients [6], and the likelihood of health care workers being exposed to these hazardous factors depends on the type of job and the nature of the work environment [12]

On January 30, 2020, the World Health Organization (WHO) declared that the new corona-virus outbreak in a public health emergency of international concern. The virus has already had a direct impact on millions of people in the city of Wuhan, China, on the 30.12.2019 as a cluster of pneumonia cases of unknown cause was reported on the PRO Med-mail website, this outbreak was linked to a seafood market in Wuhan, and in 8.1.2020 PRO Med-mail reported that the outbreak was linked to a novel CORONAVIRUS, the virus is spherical on pleomorphic, single-stranded, enveloped RNA and covered with club-shaped glycoprotein. CORONAVIRUSES are four subtypes: alpha, beta, gamma, and Delta. CORONAVIRUS and affecting both man and animals.[13]

If hospitals do not have a safe work environment and occupational health and safety methods and procedures are not applied, then health care workers may be exposed to occupational hazards. [2]defined occupational health risks as the potential health and safety risks for workers who work outside the home.

The Study Problem

The problem of the study lies in the fact that hospitals as the places for hospitalization, but at the same time they are an incubating environment for many risks to public and occupational health, and therefore the health care workers in health facilities are exposed to occupational risks, including microbial contamination and new corona in the work environment, which exposes them to infection and thus has Impact on public health. The interest of health facilities in the field of occupational health for their workers, especially health practitioners, has a great impact in the field of awareness, follow-up, measurement and risk reduction, which leads to an improvement in the work environment.

The Study questions

The study problem is determined in the following questions:

1. What is the extent of knowledge, trends and practices of health care workers regarding microbial occupational exposure, especially the emerging corona virus, in their work environment?

2. Is there an effect of training and education of workers in the field of occupational health and occupational safety procedures?
3. Is there an interest in occupational health in the health facilities under study?

OBJECTIVES OF THE STUDY

1. Identify the extent of application of occupational safety and health standards among health care workers.
2. Study the effect of the training and education program on raising awareness among workers.
3. Identify the extent of health care workers 'awareness of occupational exposure to microbes and also to the emerging corona virus.
4. Improving the level of awareness of hospital workers about the risks of occupational exposure to microbes and also to the emerging corona virus.

The Importance of The Study

The Theoretical Importance

The theoretical importance of this study is that it is an attempt to contribute to filling the deficiency in studies dealing with occupational health in the Kingdom of Saudi Arabia, specifically in peripheral areas, and raising awareness of the risks to which health personnel are exposed in the field of health care, especially in the aspect of biological semen exposure to microbes and also to the emerging corona virus, By the following:

- Enriching the field of health care and health fields in general about occupational and occupational safety standards at the regional level as well as the national level by applying new models in raising awareness about semen exposure to health personnel working in Eastern Region hospitals, the causes of exposure to microbes and also the emerging corona virus and how to set occupational safety and health measures In the field of health care.
- Emphasizing the importance of the qualification and training role for working cadres in terms of applying policies, regulations and laws in providing occupational safety and occupational health standards and preventing risks to health care workers in light of the Corona pandemic.
- Providing experts and those interested in the field of occupational health with information in the field of occupational exposures to assist them in preparing plans and programs to protect against occupational risks by applying the following:
- Reconsidering the risks associated with modern technologies, and monitoring the risk of infection transmission from modern devices and equipment, before approval for use.

Applied Importance

The results of this study can be used in applying occupational safety standards, especially the following groups:

- Workers in hospitals and health centers, especially health practitioners.

- Trainers in health and professional training institutes, continuing education departments, training centers in public and private hospitals and other health institutions.
- Senior management and health policy designers, especially in the field of infection control, risk management, occupational safety and health, to create clear and accurate occupational health programs.

The Limits of The Study

The results of the study were determined in light of the following limitations and limitations:

- Human limit: This study was restricted to a sample of health personnel (nursing physicians - laboratory technicians and specialists).
- Spatial limit: a number of governmental and private hospitals in the Eastern Province.
- Time limit: This study was conducted from the beginning of April 2020 until the end of August 2020.

TERMINOLOGY OF THE STUDY

Microbial occupational exposure: is the exposure of staff working in hospitals and medical centers to infectious diseases resulting from exposure to live microbes while practicing work, either directly or indirectly.

- ***Microbial Pathogens:*** They are those microbes that may transmit any of the infectious diseases, worse bacteria, viruses, parasites and fungi.
- ***Healthcare:*** It is that field that provides comprehensive and basic health services to all individuals, society, and the main axis and nucleus of the health system in hospitals.
- ***Work place environment pollution:*** It is pollution that occurs in the work environment due to the transmission of microbes between workers in the sick care sector, such as bacteria and parasites that cause various infectious diseases to human health and result in an unsafe work environment.
- ***Healthcare Workers:*** They are hospital workers in all departments, including doctors, nurses, and various groups working in hospital units and departments.

THEORETICAL FRAMEWORK AND PREVIOUS STUDIES

Biological Hazards

Healthcare workers are exposed to many biological agents, such as viruses, bacteria, parasites, and fungi. Hepatitis B virus (HBV), hepatitis C (HCV), HIV infection (AIDS), and tuberculosis are a particular concern among health-care workers, particularly from skin infections and bio-aerosols in the event. Tuberculosis [1]

Infection is one of the most important problems in healthcare worldwide [14]. Nursing staff is an integral part of the healthcare delivery system and they face a variety of occupational work environment risks, which can be categorized into biological, chemical, physical and psychosocial risks [12].

AMONG THE BIOLOGICAL HAZARDS

Risks of injuries, acupuncture and sharp objects

Acupuncture and sharps injuries are still the most prevalent and most commonly affected among direct caregivers (2000 USDL). Also, health care providers who work full-time may be more susceptible to work-related injuries than part-time workers.

MEDICAL WASTE

There are several proposed definitions of medical waste (hospital waste), medical waste being any solid waste generated during the diagnosis or treatment of patients or animals [1]. Or medical waste is defined as waste containing infectious agents capable of transmitting this disease to humans[15] or is meant as any waste produced by medical treatment institutions, and it includes hospitals, medical laboratories, centers or units for conducting animal experiments and clinics. Under the United States Environmental Protection Agency, medical waste is a major concern in addition to containing traditional toxic pollutants such as mercury, plastics, and organic solvents [16].

Microbial Occupational Exposure Among Hospital Workers

The pathogens of infection are transmitted in health care centers in various ways and from a variety of sources such as air, water, food, insects, and rodents, animals such as cats, patients themselves, visitors, cleaners, surfaces, tools and devices. Microbial contamination in hospitals arises from several sources, the most important of which is the natural growth of microorganisms that are naturally present on the skin, respiratory or digestive system of people, and it is known as internal infection. With external infection [7].

Measuring awareness (knowledge, behavior and practice) ((KAB)

Knowledge refers to what everyone or anyone knows about a subject [17], attitude or behavior refers to a physical and emotional situation the manner and performance [18], practice is the practice of professional and specialized work with theoretical integration [14], and so it is related Poor knowledge of occupational risks by increasing occupational risks [19]. A knowledge, attitude (behavior) and practice (KAP) assessment of standard precautions by healthcare workers is a prerequisite for initiating and implementing a successful infection prevention and control strategy in any health facility [20]

The role of training and awareness of workers in occupational health programs

The strategic objective of training is to contribute to the success and continuity of the institution, and it is done by developing the appropriate training plan that maintains a high level of skills and competitive capabilities of workers, outstanding performance, and continuous improvement. [21].

SECOND: PREVIOUS STUDIES

1. A study (Mohamed, A.F, 2012)[21] entitled "Health and safety risk assessment among health service providers at European Gaza Hospital." This study aimed to assess the health and safety risks among health care providers in the European Gaza Hospital. The study used a cross-sectional analytical will. The study population may consist of doctors and nurses who work in emergency, operations and intensive care departments and their number was 230 (105 doctors and 125 nurses) who responded to participate In the study, what equals 198 (86.08%). The results of the study were summarized by the existence of a lack of professional training for health care providers towards identifying occupational health and safety risks in the European Gaza Hospital, and that they are in urgent need of that.

2. A study (Timilshina, N., 2011)[11] titled “Risk of infection among primary health workers in the Western Development Region, Nepal: knowledge and compliance” The aim of this study was to determine the occupational health risks faced by nurses. 132 nursing staff participated in the study and a questionnaire was used to collect data. Descriptive and inferential statistics were used to analyze the data. The study highlighted a lack of knowledge and training in occupational health and safety for nurses at Licholatepe Memorial Hospital. It was found that nurses lack the necessary knowledge in legislation, policies and strategies that govern occupational health and safety in the workplace. Some occupational and health risks in the hospital are related to a lack of knowledge of the international standards required in health facilities, which calls for intensifying training programs and raising awareness.

3. A study by [15]This study aimed to shed light on the reality of the occupational safety of sanitation workers in Palestinian hospitals and its relationship to the reality of dealing with medical waste in these hospitals that only 2.37% of cleaners have received training on how to deal with medical waste. The lack of great concern of officials in the safety of workers and achieving their satisfaction, and there is a great shortage of infrastructure for dealing with medical waste.

4. The study by (Nour 2017)[22] aimed to assess the knowledge, trends, and practices of health care residents in public hospitals in Makkah Al-Mukarramah about MERS-CoV infection, and to evaluate the effectiveness of a health education intervention to improve information, trends and practices. It evaluated the

information, trends and practices among 281 participants. Of the categories of (physicians, nursing and health technicians) with a self-answering questionnaire, then they underwent a follow-up after the intervention in health education using a combination of methods. The results showed a significant improvement after the intervention, as the rate of (knowledge) increased from 32% to 53% and the rate of behavior (trends) increased from 8.2% to 5.16%, while the practice rate did not increase at a high rate and it was high in the pre-evaluation where the percentage before the intervention was 87.9%. After the intervention, it was 92%.

5. A study by (2016, Ganesh)[23], the aim of this study is to review the literature and previous studies on knowledge and perceptions of risks, and practices related to occupational exposure to infectious diseases in Malaysia, particularly with regard to blood-borne infections, global precautions, uses of personal protective equipment and protective equipment, and medical waste management. The study recommended that data on perceptions of health care workers' knowledge about health risks are important and useful in developing policies and occupational and occupational safety standards for the prevention and control of occupational diseases in health care in Malaysia.

6. A study by (Sara 2015)[24], this study aimed to evaluate occupational safety and health measures in Sudanese hospitals from the workers' point of view and their impact on improving the performance of workers. Khartoum Teaching Hospital was chosen as a case study in the period between (November - December 2014). Descriptive. A questionnaire was prepared to collect the necessary data consisting of 5 dimensions, including 30 items, and the study concluded that workers did not receive adequate training on how to use occupational safety tools and tools. The study recommended the need to establish a specialized department for occupational safety and health management within health institutions, and the need to pay attention to training workers to enhance awareness and develop their skills, and work to implement all laws and regulations related to the safety and protection of workers in health institutions.

THIRD: STUDY METHODOLOGY

Study Approach

The researchers used the descriptive analysis study method. The researchers designed a questionnaire to survey and analyze the reality of the awareness of workers in the participating hospitals in the study about occupational risks and basic procedures for occupational safety and health. The method was also used as an experimental appetite (quazi experimental) through pre and post exams during which Measuring the effect of appropriate training for workers through a health professional training program, and measuring the effect of this training on a change in the understanding and knowledge of the field of health and safety of workers and their knowledge of the potential risks associated with providing health care.

Training Program

A training and educational program was designed for the study sample in two hospitals (governmental and private) about occupational exposure and ways to prevent it, taking and means of personal protection and knowledge of the principles of occupational health. Training of trainers (TOT). After the program, the benefit of the study sample was measured in the two hospitals and its impact on awareness, knowledge and occupational safety measures. The steps were as follows:

1. Determine the general framework of the program, including the definition of the program and its main objectives, taking into account the results of the pre-study to focus on its weaknesses.
2. Determine the content of the training program, so that it includes the concept of occupational health and safety for hospital workers, the potential risks associated with providing health care, the importance of vaccination against hepatitis B virus, the importance of continuous use of personal protective equipment, the development of understanding, behavior and practices.
3. Design appropriate training activities to achieve set goals.
4. Choosing the educational aids and tools used in the training program.
5. Preparing the evaluation for the training program, and the researcher adopted the evaluation on the post-cognitive test.

Study population

The study population consisted of health care workers (doctors, nurses, laboratories) in 5 hospitals in the Eastern Province, whose number is (2138) employees. Table (1) represents the percentage of each hospital and each specialty from the study sample.

The Study Sample

The study sample consists of (402) workers from the study population. Where the Stephen Thompson equation was used, namely:

$$\frac{N \times p\,(1-p)}{N-1 \times (d^2 : Z^2) + p(1-p)}$$

$$\frac{2138 \times 0.50\,(1-0.50)}{2138 -1 \times (0.05)^2 \div (1.96)^2) + 0.50(1-0.50)}$$

Where the icons indicate:

N: The size of the community
Z: the standard score corresponding to the significance level (0.95) and equal to (1.96).
d: error ratio equal to (0.05)
P: the ratio of availability of the property and the neutral and equal to (0.50)

By applying the equation, the study sample becomes = 402

Table (1) Distribution of the study population.

Hospital	Doctors	Nursing	Laboratory	Total	Percentage
King Fahd University Hospital	300	615	60	975	45%
Astoon Hospital	201	387	34	622	29%
Gulf Specialist Hospital	70	150	35	255	12%
Al-Sadiq Hospital	50	80	23	153	7%
Tadawi General Hospital	45	88	15	148	7%
Total	666	1320	167	2153	100%
Percentage	31%	61%	8%	100%	

Study Tools

Questionnaire

The tool was built by working with infection control and occupational safety departments and doctors specializing in public health and occupational safety and what was extracted from previous studies and judged, and then it was finalized when it is applied to the main study sample.

The questionnaire was designed based on previous studies and theoretical literature, and by working with infection control and occupational safety departments and doctors specializing in public health and occupational safety. The questionnaire consists of four sections as follows:

1. General information about health professionals in the selected hospitals, such as: age, gender, experience, job, and years of experience.
2. Phrases that measure the extent of the study sample's knowledge of health practitioners of the occupational risks surrounding them and the principles of occupational health.
3. Phrases that measure attitudes and behavior of the study sample of health practitioners towards occupational hazards.
4. Phrases that measure the reality of application and practice of basic occupational safety and health procedures during work practice.
5. Phrases that measure the level of training of health practitioners in the hospitals under study.

Cognitive Test

To find out the effect of training on the awareness of hospital workers, before and after test was performed, by comparing the pre-test, which is the initial

questionnaire that was used to measure the extent of awareness and the post-test, in which the same tool was used after the training and educational intervention to measure the extent of the impact and it was applied to only two hospitals in which the program was applied Training.

Fourth: Showing the results

The following are the results of the axes for the total group (before the training program) compared to the experimental group (after the training program).

1. Comparison of knowledge axis answers in the total and experimental group:

Table (2) shows that the highest percentage of correct answers was 96.5% for people who had knowledge about occupational risks before the training program. After the training program, the percentage increased significantly, as the percentage of correct answers ranged between (96.8 - 100%).

Table (2) A comparison between the answers to the terms of the knowledge axis in the total group and the experimental group.

No. Phrase	Phrase	**Before the program the total group "n = 402"**				**After the program, the experimental group "n = 62"**				P. Value
		correct answer		wrong answer		correct answer		wrong answer		
		No.	%	No.	%	No.	%	No.	%	
1	Do you have knowledge about occupational risks?	388	96.5	14	3.5	62	100	0	0.0	0.233
2	What substances are not considered professionally hazardous from the following?	155	38.6	247	61.4	60	96.8	2	3.2	0.001
3	What material is not considered an occupational enemy of the following?	142	35.3	260	64.7	60	96.8	2	3.2	0.001
4	The most likely source of occupational infection is one of the following:	95	23.6	307	76.4	62	100	0	0.0	0.001
5	During which of the following activities is an acupuncture injury more likely?	109	27.1	293	72.9	61	98.4	1	1.6	0.001
6	Which of the following is contrary to standard precautions?	280	69.7	122	30.3	61	98.4	1	1.6	0.001
7	Did you know that hand washing is an important practice to prevent transmission?	95	23.6	307	76.4	62	100	0	0.0	0.001
8	Microbes are transmitted through the air, especially the Corona virus	125	31.1	277	68.9	61	98.4	1	1.6	0.001
9	Is the air pressure in the insulation rooms?	131	32.6	271	67.4	61	98.4	1	1.6	0.001

2. A comparison between the answers to the axis of trends in the total and experimental group.

Table (3) shows us that the arithmetic mean of all the items of the axis of the trends for healthcare workers in the five hospitals before the training program for the total group is equal to (2.66) and after the training program for the experimental group the mean of all the expressions of the directions axis was 4.80.

Table (3) A comparison between the answers to the axis of trends in the total and experimental group.

No. Phrase	Phrase	Before the program		After the program		T Value	P. Value
		Total group		Experimental group			
		Mean	SD	Mean	SD		
1	Occupational risk is an issue that must be taken seriously and given immediate attention	2.82	1.4	4.98	0.3	4.55	0.001
2	Occupational risk prevention is a shared responsibility of hospital management and staff	2.66	1.52	4.8	0.44	5.11	0.003
3	Paying more attention to occupational risks is an unnecessary burden	2.8	1.59	4.66	0.9	4.02	0.006
4	It is necessary to train employees and provide personal protective equipment to reduce exposure to occupational risks, especially the emerging corona virus	2.68	1.45	4.85	0.45	4.33	0.003
5	Protective clothing and face masks should be worn in procedures where splash / leakage of blood is a possibility	2.81	1.55	4.8	0.5	3.95	0.001
6	Gloves should always be worn when practicing injections, from intravenous injection to cell isolation	2.88	1.52	4.69	0.55	4.27	0.001
7	Hands should be properly washed after every contact and contact with the patient	2.72	1.56	4.82	0.52	4.23	0.001
8	The cap of a used needle should never be returned	2.65	1.43	4.82	0.3	5.42	0.001
9	Sharps should be disposed of in boxes	2.78	1.44	4.69	0.25	4.52	0.005
10	Medical waste bins should be located a few feet from the practice site	2.66	1.52	4.78	0.22	5.93	0.003
11	All health workers should receive vaccinations for hepatitis C, measles, mumps, rubella and influenza	2.75	1.51	4.85	0.35	4.23	0.004
12	All health workers should avoid standing for long periods of time	2.63	1.44	4.76	0.33	4.11	0.003

13	All exposures to occupational hazards should be reported and appropriately documented by the appropriate authorities	2.54	1.43	4.82	0.39	4.06	0.002
14	Providing a sufficient number of hospital staff is a way to reduce occupational risks	2.53	1.4	4.87	0.4	5.1	0.006
15	Incentives should be provided to adhere to global safety precautions	2.01	0.9	4.82	0.39	4.32	0.002
16	Average Total paragraphs axis	2.661	1.444	4.801	0.419	4.543	0.005

3. A comparison between the answers to the axis of practices in the total and experimental group.

Table (4) shows us the phrases of the axis of practices before and after the training program, where the arithmetic average of the axis of practices before the training program was 0.51, where the highest arithmetic average was 0.55 and the arithmetic average after the training program was equal to (0.99).

Table (4) A comparison between the answers of the axis of the practices in the college group and the experimental group.

No. Phrase	Phrase	Before the program		After the program		T Value	P. Value
		Total group		Experimental group			
		Mean	SD	Mean	SD		
1	Are you aware of safety precautions against occupational hazards?	0.51	0.5	1	0	6.2	0.001
2	If yes, which of the following precautions are you aware of and practicing?	0.55	0.52	1	0	4.52	0.001
3	Hand washing with a bactericidal agent	0.5	0.55	0.99	0.22	3.55	0.001
4	Barrier methods	0.5	0.53	1	0	6.01	0.001
5	Gloves	0.52	0.52	1	0	6	0.001
6	Full protective uniform	0.49	0.52	1	0	6.12	0.001
7	Caps	0.5	0.44	1	0	6.06	0.001
8	Protective glasses	0.52	0.5	1	0	6.11	0.001
9	Masks	0.55	0.5	1	0	6	0.001
10	Safe disposal of sharps	0.5	0.5	1	0	6.06	0.001
11	Complete immunization	0.5	0.5	1	0	6.06	0.001
12	Preventive treatment and / or post-exposure procedures	0.52	0.5	1	0	6.02	0.001
13	Do you have work aids (such as instructions) explaining the procedure and safety precautions at your job?	0.51	0.5	1	0	6.07	0.001
14	How well do you comply with safety precautions	0.53	0.5	1	0	6.09	0.001
15	If not "always," why?	0.52	0.5	1	0	6.08	0.001
16	How important is compliance with safety precautions?	0.51	0.5	0.95	0.11	6.011	0.001
	Total arithmetic mean	0.514	0.505	0.996	0.021	5.810	0.005

4. A comparison between the training wipe answers in the college group and the group.

Table (5) shows us the answers for the phrases of the training axis before and after the training program, where the arithmetic mean of the phrases of the training axis before the training program was 0.46 and the highest arithmetic average was 0.5. As for the phrases of

the training axis after the training program, the highest arithmetic mean was 0.96. The average standard deviation was before the program the training ranged between (0.42 - 0.50), and after the training program, the mean standard deviation ranged between (0.00 - 0.31).

Table (5) A comparison between the answers of the training axis in the total group before the program and the experimental group.

No. Phrase	Phrase	Before the program		After the program		T Value	P. Value
		Total group		Experimental group			
		Mean	SD	Mean	SD		
1	Where did you get your information on occupational risks?	0.5	0.5	1	0	4.53	0.001
2	Is the information sufficient?	0.5	0.5	1	0	4.53	0.003
3	Have you been trained in occupational hazards and prevention strategies?	0.42	0.5	0.89	0.31	4.5	0.006
4	How many times have you attended training sessions on semen exposure to hazards and preventive strategies in the past 12 months?	0.44	0.44	1	0	4.5	0.001
5	Have you heard or seen any communication about occupational risks in the last month?	0.43	0.5	0.89	0.31	4.48	0.005
6	Which of these channels do you prefer about professional risk messaging?	0.5	0.5	1	0	4.53	0.003
7	Did you know about procedures in place to deal with occupational microbial hazards in this hospital?	0.42	0.51	0.89	0.31	4.5	0.004
8	In this hospital, is there a dedicated unit that manages occupational health and exposure to employees?	0.5	0.5	1	0	4.53	0.002
	Total	0.44	0.49	0.89	0.31	4.5	0.003

DISCUSSING THE RESULTS

Axis of Knowledge

Through the results, this study is consistent with the study conducted by (Muawia et al. 2006)[20] a descriptive survey to investigate the level of knowledge about occupational hazards of health care workers, of nurses in health facilities in Abeokuta, Ogun State, Nigeria. The results showed that 96.2% of respondents know that the profession is exposed to occupational hazards, and a study (izegbu, 2006) showed that 28% of the respondents to the questionnaire are aware of standard precautions, and that their knowledge, attitudes and practices of biological hazards were weak.

The results of the Najat 2017[22] study in Jeddah, Saudi Arabia, showed that the majority of the survey participants (90.0%) had a good level of knowledge of standard precautions of occupational hazards. A similar result was obtained in the Nigerian study (Otovwe, 2017)[8]. Participants also reported that the level of knowledge they had was (88.8%) In the study [25] in Saudi Arabia, only 44.4% of the respondents had a good level of knowledge. Also, a study (Timilshina, 2011) [11] in Nepal showed that only 41.0% had a good level of knowledge.

Axis of directions (behavior)

This study was similar to some studies such as [12]which showed that the main risks that the nursing staff and doctors were exposed to while working were the result of contact with the patient's blood due to not wearing personal protective clothing such as gloves and face masks, and a study (Trinkoff, 2006)[26] that showed the presence of A statistically significant relationship between working hours and prolonged standing and the risk of developing neck, back and shoulder pain. As well as a study (Lugah et al. 2010)[27], which noted that 62.7% of the participants in the questionnaire found that they are well aware of the importance of using personal protective clothing when dealing with taking a sample from the patient.

Practice axis

It is evident from the results of the study conducted by the researcher that the percentage of wearing gloves when practicing injections was (46.9%). As for washing hands before every contact and contact with the patient, it was about (50%), and it is consistent with the study conducted in the United Kingdom. Doctors view washing hands prior to these procedures as a waste of time [28]. Likewise, a study from Australia reported that dermatologists do not wash their hands before wearing gloves[17]. This finding is supported by those studies conducted in the USA, Nigeria, Iran, France and China which found that nurses and physicians did not always use universal precautions when caring for patients[10]. These results are also consistent with studies in Saudi Arabia and the United Kingdom that knowledge, behavior, and practices related to wearing gloves while drawing blood samples was very low among nurses and doctors [29]

Training axis

These results coincide with some studies, such as a study[30], which reported the poor level of knowledge and awareness of all the laboratory officials and students of the study regarding the systems and means of occupational safety and security applied due to the lack of training. This

study differed with the study[15], which reported that only 2.37% of cleaning workers received training on how to deal with medical waste, and the researchers believe that the difference in the work environment and the educational level of sanitation workers in hospitals compared to workers with degrees in Palestinian universities. Also, this study is consistent with the findings made by [9], as it became clear that there is a lack of training programs for occupational safety and health and that workers do not have sufficient skills at work. Studies conducted by Shires (2003)[29] indicate that nurses who do not receive occupational health training are susceptible to acute injuries that lead to blood-borne diseases.

Summary of study results

After analyzing and interpreting the data, the researcher came to several conclusions:

1. That a large percentage of health care workers and survey participants had good knowledge about occupational risks and it increased after the training program.
2. A large percentage of the participants do not have knowledge of the microbes that are transmitted through the air.
3. The lack of clear instructions explaining safety procedures and precautions at work.
4. Lack of commitment of workers to occupational safety and health precautions.
5. The participants in the questionnaire are not aware of safety precautions against occupational hazards.
6. The employees 'lack of interest in safe practices in the work environment.
7. Staff knowledge and practice of hand washing was weak.
8. The importance and effectiveness of training for health care workers to prevent occupational risks.
9. Health care workers did not receive training on occupational hazards in hospitals and on the importance of occupational health.
10. The absence of a specialized apparatus for occupational safety and health in hospitals.

Recommendations and proposals

1. The importance of having an occupational safety and health department in hospitals. This department consists of a specialized occupational safety and health apparatus that fits the size of health care workers.
2. The importance of forming an occupational safety and health committee. The committee meets at least once a month and within 48 hours in the event of a serious accident.
3. Comprehensive assessment of work environment risks, including biological risks (bacteria, viruses, fungi) in light of the Corona pandemic. As well as physical hazards (noise, radiation, heat, ventilation, lighting), and chemical hazards.
4. Activating the role of regulatory authorities to inspect occupational safety and health procedures, laws, regulations and legislation and conduct environmental measurements to monitor the work environment.
5. Organizing occupational health and safety awareness activities by holding seminars, workshops, posters, billboards, flyers and brochures, with the help of audio-visual media.
6. Provide personal protective equipment for health care workers, according to the type of occupational exposure.

7. Encouraging the continuation of research in the field of occupational safety and health and support programs, including the infection control and disease immunization program.

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